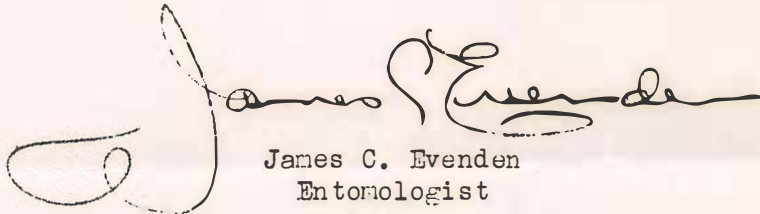


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ANNUAL FOREST INSECT STATUS REPORT
SEASON 1934

To Officers in Charge of Organizations:

It is requested that this report be circularized through
that portion of your organization interested in forest protec-
tion.



James C. Evenden
Entomologist

Forest Insect Field Station
Coeur d'Alene, Idaho
March 15, 1935

REGION ONE
ANNUAL FOREST INSECT STATUS REPORT
Season 1934

This report has been prepared in continuation of the practice of submitting to all forests a summary of the rangers' annual insect status reports of Region 1, with a brief review of important entomological activities. The writer wishes to emphasize once more the value of these reports in depicting existing insect infestations and in contributing toward the compilation of an historical reference at this laboratory. This year's data continue to indicate a better understanding and appreciation of the economic importance of forest insect problems. Last year a new form for submitting these annual reports was adopted to answer some of the objections previously offered against the one previously used. On the new form, the number of direct questions are limited to specific data, while the actual description of the infestation is given under remarks, in the nature of the reporting officer's reaction to the situation. This year's reports substantiate the belief in these forms, and they should be used in making future reports, as this year three different forms were used. In studying these reports, it is rather apparent that many officers were reluctant to give their reaction to the existing situation. Such reluctance defeats the value of the report, as from such remarks a much better depiction of conditions can be drawn than from the answers to a few conventional questions.

The rangers' annual insect status reports provide the only available source of information relative to insect conditions throughout the region, and such a picture, to be dependable, must be based upon authentic data. As some field work will be necessary in connection with all infestations, each ranger should have sufficient time to satisfy himself as to actual conditions. Annual examinations of all areas are necessary, for though there is no infestation, the same conditions may not prevail the following season. It is not necessary for reporting officers to be trained entomologists, but they should be able to recognize the most important forest insects and appreciate the importance of the task upon which they are engaged. There is still a tendency to minimize the importance of what is called a normal infestation. Normal infestations are potential epidemics, and the change often takes place very quickly, so that unless annual examinations are made, situations may get completely out of hand before they are reported. A few infested trees along trails, roads, etc., must be viewed with alarm, and a thorough examination made in order to determine the actual status. Examinations of insect infestations should be a special project, as it has been proved over and over again that they can not be made in conjunction with other lines of forestry work.

SUMMARY OF RANGER REPORTS

Number of Forests Reporting*	15
Number of Ranger Districts Reporting	90
Number of Insect Infestations Reported	141
Number of Reports Depicting No Infestations.	17
Number of Secondary Insects Reported	14
Number of Dendroctonus Reports	101
Number of Fir Engraver Beetle Reports.	2
Number of Spruce Budworm Reports	7
Increasing Infestations	30
Decreasing Infestations.	70
Normal Infestations.	24

*Clearwater and Coeur d'Alene Forests covered by surveys. No reports submitted.

Miscellaneous Reports of Secondary Insects

Cabinet National Forest - Alpine fir beetle (*Dryocoetes confusus*)
 Spruce gall aphid (*Adelges cooleyi*)
 Spider mites on cedar (*Oligonychus americanus*)
 Alder flea beetle (*Altica bimarginatus*)
 Pine leaf scale (*Chionaspis pinifoliae*)
 Tortoise shell butterfly (*Aglaia californica*)
 Douglas fir cone moth (*Zeiraphera diniana*)
 Oregon engraver beetle (*Ips oregoni*)
 Pine butterfly (*Neophasia menapia*)
 White pine aphid (*Pineus pinifoliae*)

Custer National Forest - Pine leaf scale (*Chionaspis pinifoliae*)

Flathead National Forest - Larch sawfly

Gallatin National Forest - Alpine fir beetle (*Dryocoetes confusus*)

Kootenai National Forest - Alpine fir beetle (*Dryocoetes confusus*)

SUMMARY OF INSECT INFESTATIONS REPORTED

INSECT	YEAR	INCREASING	DECREASING	NORMAL	TOTAL
	1934	17	52	8	77
	1933	33	45	17	95
Mountain Pine Beetle	1932	64	20	12	96
<u>D. monticolae</u> Hopk.	1931	51	27	14	92
	1930	60	24	14	98
	1929	45	14	23	82
	1928	33	13	10	56

Continued		SUMMARY OF INSECT INFESTATIONS REPORTED				
Insect	YEAR	INCREASING	DECREASING	NORMAL	TOTAL	
Western Pine Beetle <u>D. brevicornis</u> Lec.	1934	1	5	4	10	
	1933	5	2	1	8	
	1932	2	2	0	4	
	1931	2	1	1	4	
	1930	4	1	0	5	
	1929	0	3	4	7	
	1928	5	4	2	11	
Douglas Fir Beetle <u>D. pseudotsugae</u> Hopk.	1934	3	8	3	14	
	1933	5	4	5	14	
	1932	13	1	5	19	
	1931	2	5	1	8	
	1930	4	2	4	10	
	1929	2	1	2	5	
	1928	5	4	2	11	
True-Fir Beetle <u>Scolytus ventralis</u> Lec.	1934	0	1	1	2	
	1933	4	0	0	4	
	1932	5	0	0	5	
	1931	0	0	1	1	
	1930	2	0	0	2	
	1929	1	0	0	1	
	1928	0	0	1	1	
Spruce Budworm <u>Coecia Pini</u> Clem.	1934	3	4	0	7	
	1933	3	4	4	11	
	1932	3	7	1	11	
	1931	1	7	1	9	
	1930	6	5	6	17	
	1929	4	9	3	16	
	1928	11	12	4	27	

The above table indicates some slight changes in the general status of the different infestations, as well as the severity of the outbreaks recorded. The change in the number of mountain pine beetle outbreaks is due to the absence of reports from the Clearwater and Coeur d'Alene. The other changes are of little importance.

Mountain Pine Beetle Infestation White Pine

Though the preceding table suggests considerable change in the status of the mountain pine beetle infestation in white pine, the data as given are somewhat misleading. For example, as both the Clearwater and Coeur d'Alene forests were covered by projected insect surveys, no ranger reports were submitted. Had such reports been submitted, they would have shown increasing outbreaks in nearly all of the white pine stands of these two forests. Furthermore, as it is realized that some of these reports were based on

rather meager data, it is possible that some situations may be more active than indicated. The following table gives in more detail a comparison of the 1933 and 1934 reports.

Forest	No. of reports		No. Increasing infestations		No. Decreasing infestations		No. Normal infestations	
	1933	1934	1933	1934	1933	1934	1933	1934
Blackfeet	3	0	1	-	1	-	1	-
Cabinet	1	2	-	1	-	-	1	1
Clearwater	2	0	1	-	-	-	1	-
Coeur d'Alene	5	0	-	-	1	-	4	-
Flathead	2	1	-	-	1	1	1	-
Pend Oreille)	7	6	1	-	4	4	2	2
Kaniksu)								
Kootenai	0	2	-	-	-	2	-	-
Selway	1	0	1	-	-	-	-	-
St. Joe	3	4	3	-	-	2	-	2
	24	15	7	1	7	9	10	5

The above table indicates a marked decline in the mountain pine beetle infestation within the white pine stands of the region. Though this may be true for some forests, it is not believed to be the general condition throughout the region. As stated, no reports were submitted from the Clearwater and Coeur d'Alene forests, which would have augmented the 1934 data to a position fully comparable to that of 1933.

On the Coeur d'Alene, the annual survey shows the infestation to be increasing in nearly all areas, while a similar survey of the Clearwater reveals a rather serious situation. Two new outbreaks of this insect in white pine were reported from the Cabinet forest and though they are listed as decreasing and normal, respectively, the Supervisor feels that they warrant further consideration. The St. Regis area reported last season was not included this year.

Only one mountain pine beetle infestation was reported from the white pine stands of the Flathead as against two in 1933. The Elk Park south fork of the Flathead infestation reported in 1932 and 1933, was followed up this year and listed as decreasing, though a large percentage of the timber has been killed. The Cold Creek infestation reported in 1932 and 1933 was not mentioned, though last year's report indicated a fairly serious condition.

The Kaniksu reports six white pine infestations as against seven of the previous year. The six reports of this year were follow-ups of

previously reported situations. The Coolin infestation reported in 1933 as being of no further importance was dropped this year.

The reports from the Kootenai list two of the areas recently placed under control, so are of little significance.

On the St. Joe, four white pine infestations are recorded as against three in 1933. It is difficult to compare this season's reports with those of 1933, as the area's descriptions are different. However, it is assumed that the infestations reported last year are included in this season's reports.

Mountain Pine Beetle in Lodgepole Pine

Forest	No. of reports		:No. Increasing: Infestations		:No. decreasing: Infestations		: No. normal infestations	
	1933	1934	1933	1934	1933	1934	1933	1934
Absaroka	2	1	-	-	1	-	1	1
Beaverhead	7	8	2	2	4	6	1	-
Bitterroot	6	5	1	2	3	3	2	-
Cabinet	1	2	1	1	-	1	-	-
Clearwater	8	9	7	-	1	-	-	-
Coeur d'Alene	0	0	-	-	-	-	-	-
Custer	1	0	-	-	-	-	1	-
Deerlodge	6	6	2	-	4	6	-	-
Flathead	3	2	2	-	1	2	-	-
Gallatin	6	5	2	4	4	1	-	-
Helena	6	4	1	-	5	4	-	-
Kootenai	2	3	2	1	-	2	-	-
Lewis & Clark	0	0	-	-	-	-	-	-
Lolo	9	9	-	2	9	7	-	-
(Nezperce)	5	5	-	1	4	4	1	-
(Selway)	4	4	3	1	1	3	-	-
St. Joe	6	3	6	-	0	1	-	2
	72	57	29	14	37	40	6	3

The above tabulation shows a rather marked decrease in the number, as well as the severity of mountain pine beetle infestations in the lodgepole pine stands of the region. This picture is somewhat misleading, as it does not depict actual conditions. The actual number of infestations reported would indicate that 15 outbreaks had died down to a point where they no longer warranted consideration. Though this is true in some instances, in others infestations are known to exist which can not be included in the summary because they were not covered by reports. As an example, there were 8 areas reported from the Clearwater in 1933, but not reported upon this year. Three areas reported

from the Blackfeet in 1933 were not included in the reports from the forests which are now administering this area. Though it is true that on some forests the infestation has decreased in severity, it is not a general condition throughout the region. Wherever this is true, it has been brought about through the lack of host material rather than a decrease in the severity of the infestation. So in reality it is believed that there has been but little change in the general status of the lodgepole situation during the past season.

Outbreaks of the mountain pine beetle exist in nearly all lodgepole pine forests of Idaho and Montana. On the Beaverhead, Deerlodge and Bitterroot Forests of Montana, as well as the Salmon, Idaho, Boise, Payette and Neperce forests of Idaho, the epidemic is decreasing, due to the fact that the timber stands have been very severely depleted, and there is but little host material remaining. On other forests where the outbreaks are of more recent inception, they are in an epidemic condition and will remain so for a number of years.

On the Beaverhead and to a more or less extent on adjacent forests, the 1933 infestation showed a marked reduction over that of the previous year. There were 17,500,000 trees attacked in 1932 and only 869,000 in 1933. This 95% reduction has been credited to the extremely cold temperatures of the 1932-33 winter, though the lack of host material in many of the areas would have resulted in a marked reduction regardless of any other factor. On the areas where ample host material remained, the 1934 infestation shows that the outbreak has started to rebuild in severity.

Some of the reports submitted are subject to question. For instance, six reports were secured from the Deerlodge, with the infestation listed as decreasing, whereas, it is rather definitely known that in some of the areas the outbreak is still in an epidemic status and undoubtedly increasing. Likewise, the Lolo gives 9 reports with 7 listed as decreasing, while it has been generally believed that the infestations on this forest were all relatively new and increasing.

Outbreaks of the mountain pine beetle also exist in nearly all the whitebark pine stands of Montana. These outbreaks have been placed in the same listing as those in lodgepole because in most cases they are closely associated. Such situations exist on the Gallatin, Absaroka, Beaverhead, Deerlodge and Helena, as well as the Yellowstone Park and Wyoming forest. There is evidence to indicate that some of these outbreaks have been in existence for a matter of three or four years, while others are of later origin. The source of these outbreaks is, of course, unknown, but one may be sure that they have not existed in their present severity for a very long period or the entire timber stand would be destroyed. There is some evidence of old work in these

areas, but there seems to be a distinct gap between this old work and the present outbreak.

The host relationship between lodgepole pine and whitebark pine is not fully understood, though it is rather thoroughly believed that whitebark pine is the preferred host, and will be selected for attack as long as it remains available. When the preferred host is no longer available, adjacent lodgepole pine will be attacked.

The severe outbreak of the mountain pine beetle which has spread northward from the badly infested forests to the south of the Salmon River, has destroyed a large percentage of the lodgepole on the Nezperce (Selway) and Clearwater forests. Six infested areas were also reported from the St. Joe in 1933, and listed as increasing. Though this year only three reports were received, one listed as decreasing and the other two as normal, it is believed that the situation is more serious than indicated. Already a large percentage of the Clearwater lodgepole pine has been destroyed, and one can expect that a comparable destruction will take place on the St. Joe. The potential danger of this infestation spreading to the more valuable white pine stands has been appreciated for some years and mentioned in previous reports. That this fear was justified was substantiated by a survey conducted last fall which indicated alarming conditions within the white pine stands of the Clearwater forest and adjacent timber lands.

Western Pine Beetle Infestation Ponderosa Pine

Forest	No. of reports		:No. Increasing:No. decreasing:		No. normal infestations	
	1933	1934	: 1933	: 1934	: 1933	: 1934
Bitterroot	0	1	-	-	1	-
Cabinet	1	2	-	1	1	1
Flathead	1	-	1	-	-	-
Custer	1	-	-	-	1	-
Kootenai	2	2	2	-	-	2
Lewis & Clark	0	1	-	-	-	1
Lolo	0	1	-	-	1	-
(Nezperce	2	2	1	1	2	-
(Selway	1	1	1	-	1	-
	8	10	5	1	2	4

The above tabulations show an increase in the number of western pine beetle infestations, but indicate a decrease in their severity. In 1933, 5 of the 8 outbreaks were reported as increasing, while this year only one of the ten reported was considered to be increasing. Last year an infestation was reported from the Flathead and listed as increasing, with 15 percent of the stand having been killed during the past two years; however, this year no mention was made of it. Though

the western pine beetle is present in an endemic status in all ponderosa pine stands of Idaho and Montana, there is no reason to assume that epidemics cannot occur. The activities of this insect should be followed with more consideration, for it is possible that in many areas the so-called normal loss is more than offsetting any increment which may be occurring within the area. We are assured that in some areas the losses from the western pine beetle are becoming quite serious, and have increased to such a magnitude as to warrant further consideration.

Douglas Fir Beetle Infestation Douglas Fir

Forest	No. of reports		No. increasing infestations		No. decreasing infestations		No. normal infestations	
	1933	1934	1933	1934	1933	1934	1933	1934
Absaroka	1	2	-	-	-	1	1	1
Beaverhead	1	0	-	-	-	-	1	-
Bitterroot	1	0	-	-	1	-	-	-
Blackfeet	3	0	3	-	-	-	-	-
Cabinet	1	1	1	-	-	1	-	-
Coeur d'Alene	0	0	-	-	-	-	-	-
Flathead	6	7	1	3	2	3	3	1
Helena	0	1	-	-	-	1	-	-
Kaniksu	0	0	-	-	-	-	-	-
Kootenai	0	2	-	-	-	1	-	1
Lolo	1	1	-	-	1	1	-	-
Nezperce	0	0	-	-	-	-	-	-
	14	14	5	3	4	8	5	3

There was no change in the number of Douglas fir beetle infestations reported, though some of last year's reports were not followed. New outbreaks were recorded from the Kootenai and Helena, which would seem to indicate that there has been but little change in status conditions during the past season. During the past few years there has been a rather general infestation of the Douglas fir beetle throughout the northern Rocky Mountain region. Some of these outbreaks have died down while others have apparently increased in severity. It is evident that this insect is still causing rather severe losses of timber, which, if timber values justify, warrant further consideration.

Spruce Budworm Infestation

In 1933 there were a total of 11 spruce budworm outbreaks reported: Absaroka 2, Clearwater 1, Coeur d'Alene 1, Flathead 1, Helena 2, Nezperce 1, and Selway 3. The Coeur d'Alene and Flathead reported increasing infestations, while the others were listed as decreasing or normal. In 1934 there were only 7 outbreaks reported as follows: Absaroka 2, Helena 1, Nezperce 1, and Selway 3. No records were received from the Clearwater, Coeur d'Alene and Flathead, and only 1 infestation was reported from the Helena as against 2 of the previous

season. No new outbreaks were reported, and it is rather generally believed that the infestation is decreasing rapidly throughout the region. However, during the past series of epidemics, a large volume of timber has been destroyed, either directly or indirectly as a result of these outbreaks.

Miscellaneous Insects

Of the secondary insects which have been reported, there are a few which seem to occupy a position of economic importance. The fir engraver beetle (*Scolytus ventralis*) continues to destroy large volumes of white fir throughout the region. Alpine fir is being destroyed by the Alpine fir beetle (*Dryocoetes confusus*) throughout its range. There are other insects such as the white pine aphid (*Pinus pinifoliae*), the alder flea beetle (*Altica bimarginatus*), etc., which have become of economic prominence during the past few seasons.

FIELD SEASON 1934

Yellowstone Park Bark-Beetle Control Project

During the winter of 1932-33, a severe mortality occurred in the broods of the mountain pine beetle infesting the lodgepole pine throughout the Beaverhead and adjacent forests. To determine the extent of this mortality and its possible effect upon the status of the Yellowstone Park control project, the park and adjacent forests were covered by standard insect surveys. Data from these surveys revealed an entomological condition which justified the reopening of this project and it was so recommended, but the plan was not adopted. To determine the 1934 status of the infestation, surveys of the Beaverhead, Gallatin, Teton and Targhee National Forests and the Yellowstone Park were again instituted. These surveys, which were all conducted by and under the direct supervision of the Coeur d'Alene Forest Insect Laboratory, revealed an extremely serious infestation, requiring several millions of dollars for the institution of control.

Kootenai National Forest

Both spring and fall control operations were again directed against outbreaks of the mountain pine beetle in the white pine stands of the Kootenai Forest. During the spring operation, which included the Star, Benning, Keeler and Meadow Creek drainages, some 920 trees were treated at a cost of \$7540. The fall project, instituted as a potential clean-up of the entire infestation, included the Pete, Spread,

and Bristow Creek drainages. During this operation, ²⁰⁴⁰ trees were treated at a cost of \$9,368.10. Though the results of this project will not be known until after the 1935 attacks of the beetles, it is expected that very little work, if any, will be required in the fall of 1935.

Coeur d'Alene National Forest

Control measures were instituted on one small drainage of the Coeur d'Alene Forest in the fall of 1933, which was all that was considered as necessary. The 1934 survey revealed a more serious condition, and control measures have been recommended for ten areas on the main river above Big Creek and for one area at Honeysuckle. This project calls for the treatment of 8454 trees, at an estimated cost of \$63,000.

Clearwater National Forest

Following a preliminary examination of some of the largest white pine stands of the Clearwater Forest, an insect survey was instituted late in the season to determine the existing status of the mountain pine beetle infestation. As a result of this survey, it was found that a very large percentage of the lodgepole pine stands has been destroyed by this beetle during the past few years, and that a potentially serious condition exists in the more valuable white pine stands. The project was extended to include the adjacent private holdings which were found to be infested to a degree comparable with the National Forest areas. It was estimated that there are some 63,000 infested white pine trees on these areas at this time. As a large percentage of the areas within the National Forest are alienated, the consideration of any plan of control will involve both private and public funds.

Glacier National Park

Recommendations were made for the institution of control in the fall of 1933 against a small outbreak of the Douglas fir beetle in the scenic Douglas fir stands adjacent to St. Mary's Lake. Though this project was instituted in October of that year, a severe snowstorm necessitated the closing of the camp for that season. The project was reopened in the spring of 1934 and the work successfully completed prior to the emergence of the insects. A survey conducted during August revealed a very satisfactory condition requiring no additional control.

Yellowstone National Park

An experimental control project was instituted on Mount Washburn, Yellowstone Park, in the spring of 1933. The purpose of this experiment was to determine the feasibility of instituting control against an outbreak of the mountain pine beetle in whitebark pine without considering similar infestations in other areas a few miles away. This project was not completed at that time, so no conclusion could be drawn. A second attempt was made to complete the work in the spring of 1934, and a large percentage of the area covered by control. Approximately 2643 trees were treated at a total cost of \$8,366.65. A portion (\$1,539.54) of this expenditure was for CCC labor.

Shoshone National Forest

The fourth year of control measures against an outbreak of the Douglas fir beetle in the Cody Canyon of the Shoshone National Forest was completed during the past season. This infestation is centered in stands of Douglas fir, which were in weakened condition as a result of spruce budworm defoliation. As there were large areas of defoliated timber harboring attacks of the Douglas fir beetle, which could not be included in the bark-beetle control project, the units treated have been subjected to more or less reinfestation from these untreated regions. Regardless of this unfavorable condition, the number of trees treated in 1934 was but 18 percent of the number treated in 1931. During the past season there were 2096 trees treated by CCC labor at a cost of \$9929. Control has been recommended for the spring of 1935.

Region Four Control Project

During the past season control projects directed against outbreaks of the mountain pine beetle in lodgepole pine, were conducted on a number of forests in Region Four. A tabulated list of these projects follows:

Forest	Season	Insect	Host	Trees treated	Cost
Ashley	Spring	D. pond.	LP	1,815	\$4,380.
	"	" "	LP	49	212.
	Fall	" "	LP	1,136	3,163.
	"	D. pseud.	DF	21	875.
	"	D. pond.	WB P	75	500.
Cache	Spring	D. mont.	LP	1,847	8,048.
	Fall	" "	LP	244	458.
Uinta	Spring	D. pond.	LP	3,020	6,133.
	Fall	" "	LP	1,250	2,599.
Wasatch	Spring	" "	LP	11,453	?

Region Two Control Projects

A tabulated list of control projects conducted on the forests of Region two follows:

Forest	Insect	Host	Trees treated	Cost
Arapaho	D. pond.	LP & Lim. P.	1,700	\$ 2,450.00
Bighorn	" "	Lim. P.	3,609	2,286.00
	D. pseud.	DF	60	486.00
Black Hills	Ips oreg.	PP	1,315	387.00
Cochetopa	D. pond.	PP & LP	494	997.00
Holy Cross	D. pond.	PP & LP	37	225.00
Medicine Bow	D. pond.	LP & PP	29,853	36,478.00
Montezuma	D. pond.	PP	8,770	48,201.00
Roosevelt	D. pond.	PP	200	483.00
Routt	D. pond.	Lim.P, LP,PP	316	1,009.00
San Isabel	D. pond.	PP	43	193.00
Shoshone	D. mont.	WB P	78	189.00
	D. pseud.	DF	2,094	7,404.00
Uncompahgre	D. pond.	PP	3,413	13,790.00
Washakie	D. mont.	Lim.P, & LP	1,854	1,371.00
	D. pseud.	DF	314	421.00
White River	D. pond.	PP	347	
	D. pseud.	DF	57	869.00

SUMMARY OF ENTOMOLOGICAL INVESTIGATION

The major research project of the Coeur d'Alene Laboratory of the Bureau of Entomology and Plant Quarantine is still directed toward the study of economically important bark beetles. This project has as its final objective the development of control methods which will meet the requirements of low cost of application, effective results, and a fair degree of permanency. To arrive at such a conclusion, it has been necessary to conduct such fundamental studies as seasonal histories, host relationships, flight and migration habits, beneficial parasitic and predacious insects, associated injurious insects, as well as the proper administration and direction of control operations.

As a result of an intensive study of predacious and parasitic enemies of the mountain pine beetle, some radical departures from former practices were made in the 1933 spring control operation on the Coeur d'Alene Forest. To preserve these beneficial insects, all trees showing a certain percentage of parasitized brood were left untreated, whereas in past operations an effort had been made to locate and treat all infested trees. The object of this experiment is to preserve the beneficial insects so that they will care for that portion of the infestation which always seems to be missed during control. This season's examination of the areas where this experiment was instituted, indicated a marked increase in the population of parasitic insects and were the only units on the entire forest where the 1934 infestation did not show an increase over that of the previous season.

The above thought of directing and adjusting present control methods to preserve beneficial insects has also been applied to the control of the Douglas fir beetle. As the adult beetles emerge from the overwintering trees approximately six weeks before the parasites, control instituted in May and June against new attacks and completed before the attack of the parasites in late June will preserve these beneficial insects. The plan was instituted in the Cody Canyon project in the spring of 1934, and will be continued during the coming season.

Whenever possible, control projects have been studied with the aim of improving the effectiveness and administration of present methods. This has proved to be a difficult task due to the difference in personnel and the fact that all operations require different plans of administration. However, the need for adequate supervision stands out as an essential prerequisite for successful control. More attention will be given to this project during the coming season.

Further experiments were conducted with the view of securing more information relative to the flight habits of the mountain pine beetle. Though stationary traps were used to some extent, this work was concentrated upon the use of Weather Bureau kites to hold large insect traps aloft at high elevations. Though this equipment worked very satisfactorily, the difficulty of securing winds of sufficient velocity to raise the kites made its use nearly impossible. Further work will be conducted during the coming season with stationary traps, although further tests with the kites may be made.

Further experiments were conducted in an effort to immunize lodgepole pine trees of high aesthetic value from the attacks of the mountain pine beetle. Additional chemicals were tested as repellent sprays, and a rather large series of trees were protected around the base with wire cloth. A preliminary examination of these projects indicates that some success may result.

Tree medication as a means of controlling the mountain pine beetle in white pine was again tested during the past season. The trees treated at Sullivan Lake in the fall of 1933 were examined in April and June of 1934 and the results indicated that when trees were treated within sixty days following the beetle attack, a successful brood mortality followed. Tests of additional chemicals, as well as variations in the amounts used were conducted on the Coeur d'Alene Forest in August, 1934. The results of these experiments will not be known until after the trees are examined this spring.

The annual bark-beetle survey of the Beaverhead Forest was again conducted during the 1934 season. The purpose of this survey is to secure information relative to the serious mountain pine beetle infestation which has swept through the lodgepole pine stands of this forest during the past ten years. Data are being taken relative to the rate of spread, severity of devastation, residual stand, duration of the outbreak within a given area, and susceptibility of different age classes, timber types and trees on various exposures. Following the decided decrease in the severity of the infestation which occurred in 1933, the 1934 attack showed a marked increase in the areas where sufficient host material remained.

Conclusions

As often stated, these reports are invaluable in serving to depict existing conditions, as well as to provide an historical reference of forest insect outbreaks throughout the region. However, there

are improvements which can be made in the reports which will make the data more valuable.

1. It is believed that the value of the information secured from these reports justified the allocation of sufficient time for adequate examinations so that the essential data will be secured. Some field work will be necessary for all infestations if an accurate report is submitted.

2. The names of the different areas should be standardized and used each year. If this is done, it will permit a proper comparison of the reports for the different years.

3. When an infestation is once reported, it should be followed each year with a subsequent report. If at any time the infestation dies down so that further reports are unnecessary, a final report should be submitted stating the condition.

4. More data concerning the reported outbreaks are desired. The new form calls for the presentation of such data under remarks which should be in sufficient detail to permit the reader to form a fair conception of the situation.

It is sincerely believed that if these suggestions are followed, the reports will be more valuable and will permit the drawing of accurate conclusions.

Respectfully submitted,

James C. Evenden
Entomologist

Approved,

Elers Koch
Chief of Management